

The forming process, as shown in Step 3, typically, begins with a wiping or forming operation wherein the spacer tabs 110 and 111 are bent upward and the boot support flanges 104-107 are bent downward. (Of course, these directions are relative so long as the bends place the respective components in the proper position for the finalized chassis configuration.)

In Step 4, the sides of the chassis 101 and 102 are formed by bending or folding them upward relative to the blank. This operation forms a generally U-shaped channel comprising the sides 101 and 102 along with the bottom 103. At this time the spacer tabs 110 and 111 are formed toward each other and the support flanges 104-107 are bent away from each other. (Of course, it is contemplated that in some embodiments, the flanges 104-107 may extend toward each other.) Once the folding or bending has been accomplished, the related spacer tabs 110 and 111, as well as spacers 113 and 114, can be welded together to form a secure, sturdy support structure. The spacer tabs 110, 111, 113 and 114 operate to provide rigidity to the U-shaped chassis. The tabs (or braces) keep the sides spaced apart and also joined together.

In the event that the process was conducted as a series of steps on a single sheet or a roll of material with a plurality of blanks joined together by a connector tongue 650 as shown in FIG. 6, for example, the blanks will be separated. The separation usually occurs prior to the welding step, if appropriate.

Likewise, the axles and wheels are assembled to the chassis. Thereafter, the shoes or boots are also assembled to the chassis. At this juncture, an in-line skate with a strong, reliable chassis is completed. The chassis is relatively inexpensive to fabricate whereby the costs of making the in-line skates is reduced.

Thus, there is shown and described a unique design and concept of one piece skate chassis. While this description is directed to a particular embodiment, it is understood that those skilled in the art may conceive modifications and/or variations to the specific embodiments shown and described herein. Any such modifications or variations which fall within the purview of this description are intended to be included therein as well. It is understood that the description herein is intended to be illustrative only and is not intended to be limitative. Rather, the scope of the invention described herein is limited only by the claims appended hereto.

We claim:

1. A one piece chassis comprising:

one piece of metal formed to include;

a channel having a top, a bottom and a pair of sides;

a plurality of flanges positioned at the top of said channel

and adapted for attachment of footwear; and

a plurality of holes positioned in said pair of sides and

adapted to receive axles for skate wheels; and

predetermined regions of said one piece of metal later

formed to include coined spacers surrounding each

of said plurality of holes.

2. The chassis recited in claim 1 further including flat, annular surfaces on said coined spacers.

3. The chassis recited in claim 1 wherein said sides are substantially parallel to each other.

4. The chassis recited in claim 1 wherein said sides are inclined toward each other adjacent said top.

5. The chassis recited in claim 1 further including;

at least one support brace extending from at least one of said sides, attached to the other one of said sides, and adapted to provide rigidity to said chassis.

6. The chassis recited in claim 1 further including at least one embossment in at least one of said sides.

7. The chassis recited in claim 1 further including at least one gusset formed between each flange and the associated one of said sides.

8. An in-line skate having a chassis formed from a single piece of metal comprising:

a chassis having a top portion, a bottom portion and two sides extending in a length direction;

footwear mounted to the top portion of the chassis;

a plurality of apertures formed and positioned in the bottom portion of the chassis along its length direction;

projections coined from said bottom portion of said single piece of metal surrounding said apertures and that extend from each side of the chassis toward the opposite side of the chassis; and

a plurality of wheels and axles rotatably mounted in the apertures and spaced between the two sides of the chassis by the projections.

9. An in-line skate chassis formed from a single piece of metal comprising;

a pair of sides including a first side, and a second side rigidly positioned substantially parallel to the first side;

a first plurality of apertures formed in the first side and a second plurality of apertures formed in the second side;

a first plurality of spacers coined from the first side and extending from the first side toward the second side; and

a second plurality of spacers coined from the second side and extending from the second side toward the first side.

10. The in-line skate chassis of claim 9 further including at least one embossment in at least one of said sides.

11. An in-line skate comprising:

a chassis, formed from a single piece of metal a plurality of wheels and axles rotatably mounted to a bottom part of the chassis, and footwear mounted on a top part of the chassis;

the chassis including a first side extending along a first direction and a second side extending in a direction substantially parallel to the first;

the first side including a plurality of first side holes formed in its bottom part;

said first side holes being surrounded by a plurality of spacers coined from the first side and extending in a direction toward the second side;

the second side including a plurality of second side holes formed in its bottom part;

said second side holes being surrounded by a plurality of spacers coined from the second side and extending in a direction toward the first side;

said axles extending through said holes in said first side and said second side; and

said wheels mounted on said axles and spaced between said sides by said spacers.

12. The in-line skate of claim 11 further including at least one embossment in the first side; and

at least one embossment in the second side.

13. A method of making an in-line skate comprising:
providing a single piece of metal suitable for forming
forming said piece of metal into a skate chassis having a
top portion, a bottom portion and two sides extending
in a length direction;
forming a plurality of apertures in the bottom portion of
the chassis along its length direction;

coining a plurality of annular projections from said piece
of metal in areas surrounding said apertures to form a
plurality of spacers extending from each side of the
chassis toward the opposite side of the chassis;
rotatably mounting a plurality of wheels on axles extend-
ing through the apertures; and
mounting footwear to the top portion of the chassis.

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14. An in-line skate chassis comprising:
a channel having a top, a bottom and a pair of sides;
a plurality of flanges positioned at the top of said channel and adapted for attachment of
footwear; and
a plurality of holes positioned in said pair of sides and adapted to receive axles for skate
wheels; and
predetermined regions of said sides later formed to include coined spacers surrounding
each of said plurality of holes.

15. The chassis recited in claim 14 further including flat, annular surfaces on said coined
spacers.

16. The chassis recited in claim 14 wherein said sides are substantially parallel to each
other.

17. The chassis recited in claim 14 wherein said sides are inclined toward each other
adjacent said top.

18. The chassis recited in claim 14 further including:
at least one support brace extending from at least one of said sides, attached to the other
one of said sides, and adapted to provide rigidity to said chassis.

19. The chassis recited in claim 14 further including at least one embossment in at least one
of said sides.

20. The chassis recited in claim 14 further including at least one gusset formed between
each flange and the associated one of said sides.

21. An in-line skate having a chassis formed from metal comprising:
the chassis having a top portion, a bottom portion and two sides extending in a length direction;
footwear mounted to the top portion of the chassis;
a plurality of apertures formed and positioned in the two sides of the chassis along its length direction;
projections coined from metal surrounding said apertures and that extend from each side of the chassis toward the opposite side of the chassis; and
a plurality of wheels and axles rotatably mounted in the apertures and spaced between the two sides of the chassis by the projections.

22. An in-line skate chassis formed from metal comprising:
a pair of sides including a first side, and a second side rigidly positioned substantially parallel to the first side;
a first plurality of apertures formed in the first side and a second plurality of apertures formed in the second side;
a plurality of spacers coined from the second side and extending from the second side toward the first side.

23. The in-line skate chassis of claim 22 further including at least one embossment in at least one of said sides.

24. An in-line skate comprising:
a chassis formed from metal, a plurality of wheels and axles rotatably mounted to a bottom part of the chassis, and footwear mounted on a top part of the chassis;
the chassis including a first side extending along a first direction and a second side extending in a direction substantially parallel to the first;
the first side including a plurality of first side holes formed in its bottom part;
said first side holes being surrounded by a plurality of spacers coined from the first side and extending in a direction toward the second side;
the second side including a plurality of second side holes formed in its bottom part;
said second side holes being surrounded by a plurality of spacers coined from the second side and extending in a direction toward the first side;
said axles extending through said holes in said first side and said second side; and
said wheels mounted on said axles and spaced between said sides by said spacers.

25. The in-line skate of claim 24 further including:
at least one embossment in the first side; and
at least one embossment in the second side.

26. A method of making an in-line skate comprising:
providing a metal skate chassis having a top portion, a bottom portion and two sides
extending in a length direction;
forming a plurality of apertures in the two sides of the chassis along its length direction;
coining a plurality of annular projections from said chassis in areas surrounding said
apertures to form a plurality of spacers extending from each side of the chassis toward the
opposite side of the chassis;
rotatably mounting a plurality of wheels on axles extending through the apertures; and
mounting footwear to the top portion of the chassis.

27. A method of making an in-line skate comprising:
providing metal suitable for forming;
forming said metal into a skate chassis having a top portion, a bottom portion and two
sides extending in a length direction;
forming a plurality of apertures in the two sides of the chassis along its length direction;
coining a plurality of annular projections from said chassis in areas surrounding said
apertures to form a plurality of spacers extending from each side of the chassis toward the
opposite side of the chassis;
rotatably mounting a plurality of wheels on axles extending through the apertures; and
mounting footwear to the top portion of the chassis.

28. An in-line skate chassis comprising:
a channel having a top, a bottom and a pair of sidewalls each having at least one
surface;
a plurality of flanges positioned at the top of said channel and adapted for attachment of
footwear;
a plurality of holes positioned in said pair of sidewalls and adapted to receive axles for
skate wheels; and
short cylinders formed from said holes and extending from the surfaces of said
sidewalls.

29. An in-line skate having a chassis formed from metal comprising:
the chassis having a top portion, a bottom portion and two sidewalls extending in a
length direction;
footwear mounted to the top portion of the chassis;
a plurality of apertures formed and positioned in the two sides of the chassis along its
length direction;
short cylinders coined from said apertures and extending from the surface of said
chassis; and
a plurality of wheels and axles rotatably mounted in the apertures and supported by
said sidewalls at the location of said apertures.

30. An in-line skate chassis formed from metal comprising:
a pair of sides including a first side, and a second side rigidly positioned substantially
parallel to the first side;
a first plurality of apertures formed in the first side and a second plurality of apertures
formed in the second side;
a first plurality of short cylinders coined from the region adjacent each said aperture
and extending from the first side toward the second side; and
a second plurality of short cylinders coined from the region adjacent each said aperture
and extending from the second side toward the first side.

31. A method of making an in-line skate comprising:
providing a metal skate chassis having a top portion, a bottom portion and two sides
extending in a length direction;
forming a plurality of apertures in the two sides of the chassis along its length direction;
coining a plurality of short cylinders that extend from the surface of the chassis;
rotatably mounting a plurality of wheels on axles extending through the apertures; and
mounting footwear to the top portion of the chassis.

32. An in-line skate including an aluminum chassis, wheels mounted on axles, the axles
rotatably mounted to the chassis through holes in the chassis and a shoe or boot attached to
chassis, the improvement comprising:
coined spacers surrounding the holes.

33. An in-line skate having an aluminum chassis and coined spacers formed in the chassis.

34. A method of making an in-line skate including providing an aluminum chassis, providing and attaching a shoe or boot to the chassis and providing a plurality of wheels mounted on axles extending through holes in the chassis, the improvement comprising:
providing spacers in the aluminum chassis by coining annular projections from the aluminum in areas surrounding the holes in the chassis.

35. An improved method of making an aluminum chassis in-line skate, the improvement comprising:
forming holes in the chassis through which axles may be positioned; and
coining annular projections from the aluminum in areas adjacent the holes in the chassis.

36. An improved method of making an aluminum chassis in-line skate, the improvement comprising:
forming holes in the chassis through which axles may be positioned; and
extruding annular projections from the aluminum in areas adjacent the holes in the chassis.

37. A method of making an in-line skate comprising:
providing a first side of an aluminum chassis;
providing a second side of an aluminum chassis;
forming a plurality of axle holes in the first side;
forming a plurality of axle holes in the second side;
providing a plurality of projections in the first side by extruding from the first side aluminum adjacent the axle holes in the first side;
providing a plurality of projections in the second side by extruding from the second side aluminum adjacent the axle holes in the first side;
providing on the first side at least one flange adapted for attachment to a portion of a shoe or boot bottom;
providing on the second side at least one flange adapted for attachment to a portion of a shoe or boot bottom;
attaching the shoe or boot to the first side and to the second side; and
providing a plurality of wheels rotatably mounted through pairs of the axle holes.